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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,998	10/17/2003	Francisco J. Duarte	86679SLP	4422

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Thomas H. Close  
Patent Legal Staff  
Eastman Kodak Company  
343 State Street  
Rochester, NY 14650-2201

EXAMINER
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MENEFEE, JAMES A

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 11/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/687,998

Applicant(s)

DUARTE, FRANCISCO J.

Examiner

James A. Menefee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/17/2003
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

On the information disclosure statement, applicant has cited pending application 10/325,549. There is no copy of this document therefore it is not considered. Instead, the examiner has cited the corresponding patent application publication, US 2004/0120373. See the attached form PTO-892.

Applicant has cited the book Duarte, Laser Dye Principles. No relevant pages were given. The reference is used in this office action, therefore the examiner additionally cites the book of the attached form PTO-892 with relevant page numbers, and these pages are provided to the applicant.

### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: "44" in Fig. 1; "M<sub>1</sub>" and "M<sub>2</sub>" in Fig. 3; "M" in Figs. 5-8.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: "W" on p. 1 line 21 and p. 2 line 6.

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

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prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Claim Objections*

The numbering of claims is improper because there are two instances of claim 14. The second instance is treated herein as claim 15, and applicant should correct this in any future claim listings.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not at all clear what is meant by this claim. That is, it is unknown what is meant by the "gain medium having a high angle of incidence." A light beam has an angle of incidence, not a gain medium. Is it the LED pumping light that has a high angle of incidence upon the gain medium? Does it concern the emitted light from the gain medium? There is no discussion in the specification of angles of incidence other than concerning the grating, and no grating has yet

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been claimed in claim 8, only the pumping configuration. Thus it cannot be ascertained what is meant by the claim, nor can a reasonable interpretation be made by the examiner.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5, 7-8, and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuper et al. (US 4,949,346). See Figs. 2, 4, and discussion thereof.

Regarding claim 1, Kuper discloses a laser apparatus for emitting a beam of coherent light comprising a first and second optical element 7,8, at least one light emitting diode (“LED”) 3 producing a beam in an excitation path transverse to the optical axis of the laser (see optical axis dashed lines in Fig. 4; the LEDs produce light in up and down directions in Fig. 4, thus transverse to the optical axis), a gain medium 1 disposed in the optical axis and the excitation path, intermediate the first and second optical elements, for producing a coherent beam along the optical axis, and a guiding member 2 for directing the beam of light from the LED 3 toward the gain medium 1. While element 2 is described as a transparent heat sink, it is described that they may be provided with a reflective coating so that the pump light will not escape until it reaches the gain medium. Col. 3 lines 45-50.

Regarding claim 2, the guiding member 2 is disposed between the LED 3 and gain medium 1.

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Regarding claim 3, as noted above in the rejection of claim 1, the guiding member may include reflective material.

Regarding claim 5, the gain medium 1 is a solid.

Regarding claim 7, the gain medium 1 has a substantially planar side facing the LED.

Regarding claim 8, as noted above this limitation is unclear and indefinite. However, Kuper's setup regarding the pumping scheme is almost identical to those described by the applicant, therefore it is believed that whatever is meant by this claim it is met by Kuper since the elements of claim 8 (along with parent claim 1) concern only the pumping scheme.

Regarding claims 11-12, the guiding member comprises opposing sides that are inclined at an angle to form an opening in the excitation path opposite the LED. The opening is at the bonding layer 5, proximate the gain medium.

Regarding claim 13, Kuper discloses a method of emitting a coherent beam along an optical axis comprising directing a beam produced by an LED along an optical excitation path transverse to the optical axis, geometrically confining the beam produced by the LED (due to the inclined and reflective sides of member 2), directing the confined beam through an opening into the the gain medium 1 disposed in the excitation and optical paths, and reflecting the beam relative to the gain medium (via mirrors 7,8) to produce a beam of coherent light along the optical axis.

Regarding claim 14, due to mirrors 7,8 the reflecting step will be repeated.

Claims 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by FR 2,372,528.  
See attached English abstract.

'528 discloses a laser apparatus comprising an LED optically exciting a dye-doped gain medium. The dye doped gain medium may be made of plastics therefore it is a dye doped polymer.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duarte, Dye Laser Principles, 1990 (herein "Duarte") in view of Usui et al. (US 6,038,244), and further in view of Canady (US 6,836,502).

Regarding claim 1, Duarte discloses in Fig. 4.11 (p. 148) a laser for emitting a beam of coherent light along an optical axis comprising first and second optical elements M and Grating, a flashlamp pump for producing a beam of light transverse to the optical axis of the laser, a gain medium disposed in the optical axis and the excitation path for producing a beam of coherent light.

There is not disclosed a guiding member for directing the pump light toward the gain medium. Usui teaches such a guiding member 5 for guiding pump light from a pump source 3 into a gain medium 1. See Usui Figs. 1-3 and discussion. While Usui is concerned with laser pumping of a solid state gain medium, the principles are similarly applicable to incoherent pumping of a dye medium. It would have been obvious to one skilled in the art to use such a

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pumping scheme using a guiding member because it provides for more efficient propagation and absorption of the pump beam, as taught by Usui. See col. 2 lines 1-11.

As noted above, the pump source in Duarte is a flashlamp, not an LED. Canady teaches that it is known for LEDs to pump dye doped media, and further that LEDs are advantageous over incandescent devices, i.e. flashlamps. It would have been obvious to one skilled in the art to use LEDs for pumping rather than flashlamps, because LEDs are modulatable as taught by Canady. Col. 1 lines 41-46, col. 1 line 65 – col. 2 line 8.

Regarding claims 2-3, Usui's obvious guide member is reflective and is disposed between the pump and the gain medium.

Regarding claims 4-6, Duarte discloses that dye gain media can be solid or liquid. See par. bridging pages 18-19. Plastic, a polymer, is disclosed as one of the solids.

Regarding claim 7, Duarte discloses dye cells may have a planar side that faces the pump. See p. 254-55.

Regarding claim 8, see the rejection of claim 8 over Kuper above. The same rational applies.

Regarding claim 9, Duarte uses a multiple prism beam expander in Fig. 4.11.

Regarding claims 11-12, Usui's obvious guiding member includes opposing angled sides forming an opening in the excitation path opposite the pump and proximate the gain medium.

Regarding claim 13, the method of operation is disclosed similarly to the devices above.

Regarding claim 14, the device is a laser and therefore there will be repeated reflection.

Regarding claim 15, Duarte's device uses grazing incidence. See Fig. 4.11(b).



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Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Duarte, Usui, and Canady as applied to claim 1 above, and further in view of Duarte (US 5,181,222, herein "Duarte II"). The limitations of claim 1 are taught as above. It is not taught that one of the optical elements is an output coupler polarizer. Duarte II teaches that in a similar dye laser the output mirror may be replaced by an output coupler polarizer. It would have been obvious to one skilled in the art to use such a polarizer because it substantially reduces unwanted ASE, as taught by Duarte II.

Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duarte in view of Canady. See the section 103 rejections of claims 1 and 7 above. Claim 16 does not require the guiding member therefore the Usui reference is not required in this rejection.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Koechner (US 4,357,704) and Schiffner (US 4,035,742) also teach LED pump beams guided into solid gain media, similar to claim 1.

Ault et al. (US 6,600,766) uses LEDs to pump liquid gain media. Col. 4 lines 25-40. Ault teaches that previously flashlamps were used to pump the liquid media, with poor results. Col. 3 lines 6-9. Thus Ault's LED pumping would appear to overcome those results. While Ault is concerned with rare earth doped liquids, rather than dye doped liquids, the suggestion that LEDs

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are advantageous over flashlamps for pumping liquid gain media is applicable to the present invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (571) 272-1944. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



James Menefee  
November 23, 2005